

MACHINE STRUCTURE, IN PARTICULAR FOR HANDLING FLUID PRODUCTS,
AND PROCESS FOR ASSEMBLING IT

This invention relates to a machine structure, in particular but not restricted to machines for the handling of fluid products. The invention has been developed with particular reference to structures which contain, protect and enclose the mechanisms of machines such as for example machines dispensing dyes or machines mixing fluid products, for example paints, varnishes, enamels, inks and the like contained in cans, drums and containers of that nature. The invention also relates to a process for assembling the above-mentioned structure.

Machines of the type indicated above are normally housed and supported by frame structures which generally comprise bars, cross-members and uprights welded together to form a frame having a particular shape and dimensions. After the mechanical, electronic and working parts of the particular machine have been placed within the frame, this is normally covered with panels secured to the structure of the frame by connection systems of a known type such as screws, bolts and, in some cases, hinges or the like to allow the panels to be at least partly opened so that the components of the machine can be inspected.

One disadvantage of frame structures of the known type indicated above lies in the fact that these are not particularly flexible in construction and therefore fit with difficulty into cramped spaces, such for example the points of sale where such machines have to be used. Normally, machines of the known type have a one-piece structure with little modularity and are not particularly pleasing from the aesthetic point of view.

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Another disadvantage of machine structures of the known type comprises the fact that they must be assembled and set up in the workshop and then transported in the assembled state to the place where they will be used, with a consequent increase in costs and times for transport.

The purpose of this invention is to overcome the problems of the known art and in particular to provide a machine structure and a process for assembling it which is simple, economical and easy to apply in the place where the machine is used, even by not particularly specialised personnel.

Another purpose of this invention is to provide a machine structure which when assembled is of small size and can be easily and flexibly adapted to the special space, shape and positioning requirements of all places where the machine is in use.

In order to achieve the above-mentioned purposes this invention relates to a machine structure, in particular a machine for the handling of fluid products, comprising:

- a loadbearing frame including uprights, and
- one or more covering panels,

characterized in that the uprights extend in a substantially vertical direction and have an upper end to which or close to which there is fixed a first substantially horizontal plate for connecting the uprights, a second substantially horizontal plate being attached to the same uprights to connect them in a zone lying beneath the first plate and thus forming a zone within which the machine's mechanisms are housed, at least one of the covering panels being dismantlably mounted between two uprights to at least partly cover the housing zone laterally.

The invention also relates to a special kit and procedure for assembling the above-mentioned structure having the features indicated in claims 13 and 14 below respectively.

An advantage of this invention which derives from its modular nature and the easy assembly of the machine structure is the possibility of quickly and simply hooking on and replacing the side panels which form the sides of the structure. In this way the machine structure can be personalised with very little effort, so that its aesthetic features can be matched to the special environment in which it has to be placed. In addition to this side panels can be constructed with slogans or inscriptions and advertising images, which are easily replaceable and interchangeable, for example for the promotion of special events, offers, bargains and the like.

Another advantageous feature of this invention lies in its ergonomic nature, and in particular its especially convenient configuration for use by a standing operator. The features of the structure according to this invention make it possible to adjust it quickly and effectively to any special anthropometric characteristics of the operator, merely by altering the height of the uprights, without thereby having to act on the other parts of the machine structure.

According to a further particularly advantageous feature the structure according to this invention has three uprights and has a substantially triangular configuration in plan, preferably having sides with convexity away from the machine. In addition to being aesthetically attractive this configuration constitutes a very useful solution for locating the machine structure in the corner of a room, so as to make the optimum use of space and nevertheless provide a wide frontal surface for access to the machine.

In a possible configuration of the machine structure according to the invention it is provided that a first plate should be secured to the top ends of the uprights and the second plate should be secured to a middle zone of these uprights. In this way the machine and its mechanical components are raised off the ground, in an ergonomic position for an erect operator. The empty space beneath the second plate can be used as a locker, and in this case the zone lying beneath the second plate can advantageously be at least partly covered laterally by side panels which extend to the ground from the tops of the uprights.

The machine structure according to this invention can be advantageously used to house a complex of dispensing units for colouring agents of a generally known type, for example of the type described in document EP-A-1030972. In this case the tanks of colouring agent for each dispensing unit can be attached suspended to the first upper plate of this invention.

In the case where the structure according to this invention houses the mechanisms of a dispensing machine, the dispensing zone may comprise a recess in the panel or panels covering the front part. In this way the overall dimensions of the machine, especially in plan, remain small, and in addition to this protection is provided for the dispensing nozzle.

In accordance with a further advantageous feature of this invention it is possible to provide a supporting plane for containers of colouring agent, designed to receive the product delivered, constituting for example a table which is preferably mounted to hinge against or disappear beneath the dispensing zone.

Other advantages and characteristics of the present invention will become clear from the following detailed description

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which is given with reference to the appended drawings which are provided purely by way of non-limiting example and in which:

- Figure 1 is a perspective view of a first embodiment of a machine structure according to this invention,
- Figure 2 is a perspective view of another possible embodiment of a machine structure according to the invention,
- Figure 3 is a perspective view similar to that in Figure 1, illustrating the machine structure without its side covering panels,
- Figure 4 is a transverse cross-section through the structure in Figure 1,
- Figure 5 is a view in lateral elevation of a variant of this invention which for clarity of illustration is shown without the covering side panels,
- Figure 6 is a view along arrow VI in Figure 5,
- Figure 7 is a perspective and exploded view of the structure in Figures 5 and 6, and
- Figure 8 is a transverse cross-section on a magnified scale of the upright for the machine structure in Figures 5 to 7.

With reference now to Figure 1, a machine structure 10 comprises a loadbearing frame 11 which includes substantially vertical uprights 12 supported on the ground to support the machine structure. As a whole the machine mechanisms, of a type which is generally known and which are therefore not further described and discussed in this description, are housed in the space bounded by side panels 13, preferably hooked onto uprights 12, an upper plate 14 and a lower plate 15.

Depending upon the type and configuration of the machine components and mechanisms intended to be housed in structure

10, an access space or a working area, for example comprising a supporting plane 17, preferably mounted so that it can be drawn out with respect to the front part 16 of the machine structure may be provided in the frontal zone 16 of structure 10.

Figure 2 shows a different embodiment of structure 10 for machines in which one or more side panels 13a extend from the upper end of uprights 12 to the ground, substantially forming a semi-enclosed space 18 below lower plate 15 which forms the lower boundary for the zone housing the machine components.

As it will be better seen in Figure 3, in the preferred embodiment of the invention each upright 12 comprises a principal portion 19 which extends from the ground to the very top of machine structure 10. Principal portion 19 is preferably of a folded shape, having a flat central back 20 from which two wings 21 which are folded at their edges to form a longitudinal hook 22 extend laterally. A second portion 23 of upright having a shape which substantially corresponds to that of principal portion 19 and to which it is fixed back to back preferably extends from the ground to a median zone of principal portion 19, at which point lower plate 15 is fitted. Upper plate 14 is also fixed to uprights 12, and in particular at the tops of the principal portions 19 of uprights 12. Between plates 14, 15 and each upright 12 there is placed a folded plate 24 which together with wings 25, 26 provided along the perimeter of each plate 14, 15 comprises a stop for the side panels 13, 13a of machine structure 10.

In the particular embodiment illustrated in Figure 3, machine structure 10 is designed to receive a number of machine units M having reservoirs suspended on upper plate 14 through a plurality of shaped openings 27 made in the latter. A particular number of shaped openings 27 may be provided in

plate 14 in advance at the time of its manufacture and any shaped openings 27 which exceed the number of machine components M actually fitted on the machine can be covered by a film or sheet 28.

Figure 4 clearly shows the function of longitudinal hooks 22 of uprights 12 and the manner in which they act together with corner plates 24 to secure restrainingly support side panels 13, 13a and at the same time impart to them a curvature with a convexity away from the zone in which the components of machine M are housed.

Machine structure 10 described above can easily be delivered to the point of final use in a dismantled state. In particular an assembly kit comprising uprights 12, preferably but not limited in number to three, the two plates 14 and 15, a particular number of machine components M intended to be housed in machine structure 10, side panels 13, 13a and the connecting components (screws, bolts, nuts, washers, etc.) normally provided for the assembly of structures in kit form can be supplied.

At the time of assembly it is only necessary to secure the two plates 14, 15 to uprights 12. In particular upper plate 14 is secured close to one end of each upright 12, while lower plate 15 is secured at a predetermined distance from the aforesaid end of each upright 12. After having housed the components of machine M within the space defined by the two plates 14, 15, in particular suspending the reservoirs illustrated in the embodiment in Figure 3 from upper plate 14 after having caused them to pass through shaped openings 27, it is only necessary to cover the sides of machine structure 10 with side panels 13 restrained between two adjacent uprights 12. Side panels 13 are preferably held in a covering position by longitudinal hooks 22 provided on the uprights

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and/or a set of channels or hooks or other means of connection provided on the periphery of plates 14, 15.

If necessary, uprights 12 can also be shortened at the place where machine structure 10 will finally be used in order to make the height of the machine structure suitable for the particular dimensions of the location or the anthropometric measurements of the final user. In some cases it is possible to fit lower plate 15 close to or at the ends of uprights 12 opposite those to which upper plate 14 is fixed, thus forming a completely enclosed machine structure 10 which is particularly suitable for being supported on a working surface.

In the configurations illustrated in Figures 1 and 2, in which lower plate 15 is secured in an intermediate zone of uprights 12, the zone beneath lower plate 15 can also usefully be used to house other working machines, such as for example a machine mixing the fluid products which are to be used in combination with any machine dispensing the fluid products and/or colouring agents housed within frame 11 and protected by side walls 13, 13a, in addition to objects of various kinds.

Again in the configurations illustrated in Figures 1 and 2, supporting plane 17 is preferably mounted so that it can be drawn out from the lower surface of lower plate 15, so that it can be drawn therefrom when necessary to support containers of colouring agent in the delivery zone. Supporting plane 17 can then be caused to disappear beneath plate 15 when not in use in order to reduce the frontal dimensions of the machine structure. Of course this advantage may be obtained using equivalent solutions, for example with a supporting plane of the tilting type, hinged to the machine structure.

Figures 5, 6 and 7 illustrate a second preferred embodiment of machine structure 10, in which the same reference numbers are used to indicate parts corresponding to those previously described. Within the zone housing the components of machine M there are placed bracing ties 30, preferably two in number, in order to stiffen the structure as a whole. The two ties 30 preferably but not limited thereto both have one of their ends 30a connected to the same upright 12 through a connection plate 31 or other similar means of connection, while their opposite ends 30b are each respectively connected in a similar way to one of the other uprights 12.

In the embodiment illustrated in Figures 5, 6 and 7, lower plate 15 is mounted on the opposite end of uprights 12 to that to which plate 14 is secured. In this way machine structure 10 is particularly suitable for being supported on working surfaces, benches or shelves already present at the place where the machine structure is to be installed. On its front, the machine structure comprises a first panel 13b, of a lesser height than side panels 13. Below front panel 13b is located another panel 35 to complete covering of the front part of the machine structure. Lower panel 35 is re-entrant towards the zone where the components of machine M are housed, in relation to overlying panel 13b, so as to form a space to define a dispensing zone. Behind front panel 13b it is possible to house a support 47 fixed laterally to uprights 12 on which for example are placed devices 48 to control the components of machine M and if necessary to display the operating status of the same.

A shape 36 is made in panel 13b to allow the dispensing nozzle of the machine to project. A cap 37, overlying the upper part thereof and following shape 36, is then provided for protection of the nozzle. A shaped plate 38 is located horizontally to connect lower panel 35 and front panel 13b, and has a hole 32 for the dispensing nozzle. Below shaped

plate 38 is preferably connected a device for moistening nozzles 39, commonly known as an "autocap", for example of the type which is the subject matter of patent US-A-5842641 by the same applicant, the description of which is understood to be incorporated here for reference.

In this variant uprights 12 are each constructed of a single component whose preferred cross-section, though without being restricted thereto, is illustrated in Figure 8. This cross-section has a first closed central portion 40 flanked by wings 21, also closed, on each of which is provided a longitudinal hook 22. On the back 20 of central portion 40, as also in the connection zone between central portion 40 and wings 21, there are shaped channels 41 which extend longitudinally over the entire length of the upright. The cross-sections of channels 41 are such as to receive securing components such as nuts and the like, and have appendages 42 which retain such securing components, at the same time forming openings 33 for passage of the shanks of bolts and the like (not illustrated) for holding lower and upper plates 14 and 15 in position. By slackening off the securing components which are partly engaged in shaped channels 41 it is possible to adjust the longitudinal positions of the plates and position them at a desired height along uprights 12.

As shown in Figure 7, shaped openings 27 provided in upper plate 14 can be at least partly covered by a rigid shaped plate 45 positioned at the top of machine structure 10. As already described above with reference to covering sheet 28 in Figure 3, only the shaped openings 27 actually used for housing the components of machine M can also be provided in rigid plate 45, thus preventing the entry of contaminating agents through the other openings and improving the overall aesthetic appearance of machine structure 10.

Again with the object of improving the appearance of the machine structure, covers 46, shaped according to the cross-section of uprights 12, are inserted into the ends of uprights 12.

Naturally, the principle of the invention remaining the same, the forms of embodiment and details of construction may be varied widely with respect to those described and illustrated, which have been given purely by way of example, without thereby departing from the scope of the invention.